



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,983	09/30/2003	Tingkai Li	SLA 0785	7693

27518 7590 09/14/2005

DAVID C RIPMA, PATENT COUNSEL  
SHARP LABORATORIES OF AMERICA  
5750 NW PACIFIC RIM BLVD  
CAMAS, WA 98607

EXAMINER
----------

VINH, LAN

ART UNIT	PAPER NUMBER
----------	--------------

1765

DATE MAILED: 09/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/676,983

Applicant(s)

LI ET AL.

Examiner

Lan Vinh

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 9-11, 15-16 is/are rejected.
- 7) ☒ Claim(s) 6-8, 12-14, 17 and 18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Asano et al (US 6,407,422)

Asano discloses a method for forming a memory device. The method comprises the steps of:

preparing a silicon substrate 11 (col 5, lines 29-30)

depositing a layer of metal thin film 51 of indium/indium oxide on the substrate (col 5, lines 40-44; fig. 1)

depositing an adjacent oxide layer 52 (col 6, lines 24-26; fig. 1)

patterning and selectively etching the metal thin layer 51 without substantially over etching into the adjacent oxide layer (col 17, lines 29-35; fig. 1), the etching is performed in an etching chamber (col 11, lines 32-35)

depositing a layer of ferroelectric material 33 (col 8, lines 38-40)

depositing a top electrode 34 on the ferroelectric material 33 (col 5, lines 36-40)

completing the ferroelectric device (col 15, lines 5-13)

Regarding claim 2, Asano discloses the step of forming a sub-oxide layer on the silicon substrate (col 6, lines 1-4)

Art Unit: 1765

Regarding claim 3, Asano discloses forming a high-k oxide on the substrate (col 8, lines 40-42)

The limitation of claim 4 has been discussed above

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5, 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asano et al (US 6,407,422) in view of Chino (US 6,613,679)

Asano method has been described above. Unlike the instant claimed inventions as per claims 5, 9, Asano fails to specifically disclose etching the metal thin film using BCl and Cl gas

Chino discloses a method for fabricating a semiconductor device comprise step of etching a metal film using BCl and Cl gas (col 9, lines 34-36)

Thus, one skilled in the art at the time the invention was made would have found it obvious to modify Asano etching step by etching the metal thin film using BCl and Cl gases as per Chino because Chino discloses that InP layer is dry-etched using a mixture of BCl and Cl and dry etching is performed to prevent the active layer from being tapered (col 9, lines 32-39)

Regarding claim 10, Asano discloses the step of forming a sub-oxide layer on the silicon substrate (col 6, lines 1-4)

Regarding claim 11, Asano discloses forming a high-k oxide on the substrate (col 8, lines 40-42)

5. Claims 15-16 rejected under 35 U.S.C. 103(a) as being unpatentable over Asano et al (US 6,407,422) in view of Chino (US 6,613,679)

Asano discloses a method for forming a memory device. The method comprises the steps of:

preparing a silicon substrate 11 (col 5, lines 29-30), Asano also discloses the step of forming a sub-oxide layer on the silicon substrate (col 6, lines 1-4)

depositing a layer of metal thin film 51 of indium/indium oxide on the substrate (col 5, lines 40-44; fig. 1)

depositing an adjacent oxide layer 52 (col 6, lines 24-26; fig. 1)

patterning and selectively etching the metal thin layer 51 without substantially over etching into an adjacent oxide layer (col 17, lines 29-35; fig. 1)

depositing a layer of ferroelectric material 33 (col 8, lines 38-40)

depositing a top electrode 34 on the ferroelectric material 33 (col 5, lines 36-40)

completing the ferroelectric device (col 15, lines 5-13)

Unlike the instant claimed invention as per claim 15, Asano fails to specifically disclose etching the metal thin film using BCl and Cl gas

Art Unit: 1765

Chino discloses a method for fabricating a semiconductor device comprise step of etching a metal film using BCl and Cl gas (col 9, lines 34-36)

Thus, one skilled in the art at the time the invention was made would have found it obvious to modify Asano etching step by etching the metal thin film using BCl and Cl gases as per Chino because Chino discloses that InP layer is dry-etched using a mixture of BCl and Cl and dry etching is performed to prevent the active layer from being tapered (col 9, lines 32-39)

Regarding claim 16, Asano discloses forming a high-k oxide on the substrate (col 8, lines 40-42)

### ***Allowable Subject Matter***

6. Claims 6-8, 12-14, 17-18 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 571 272 1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1765

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to be 'LV' followed by a stylized flourish.

LV

September 12, 2005